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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,875	09/23/2003	Sean Christopher Erickson	03-1091	3616

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LSI Logic Corporation
Legal Department - IP
MS D-106
1621 Barber Lane
Milpitas, CA 95035

EXAMINER

EASTHOM, KARL D

ART UNIT PAPER NUMBER

2832

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/668,875

Applicant(s)

ERICKSON ET AL.

Examiner

Karl D. Easthom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 11-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear how the resistor of claim 1 can be in a circuit without voltage at each terminal. This is a bias voltage, since there is a voltage.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3, and 5-6 are rejected under 35 U.S.C. 102(b) as anticipated by Dorda et al. (4,219,829). Dorda discloses the claimed subject matter at Figs. 3 with first and second contact regions 2,3 under the contacts 4, 5, substrate 1, a P substrate, the diffusion region of opposite conductivity in the P Substrate, and third Schottky contact 17. Diffusion and variable resistance is at col. 3, lines 1-15. The depletion region is the pinch off region at col. 4, lines 45-60. There is no bias disclosed at Fig. 3 so that a lack of bias is contemplated such as when the device is not in use. In claim 3, the p substrate is at col. 4, lines 30-35. In claim 5, the n+ regions are at col. 4, lines 20-25. In claim 6, metal is hatched at the figure for all the contacts, 4, 5, and 17 in the same manner, where 17 is denoted as metal at col. 5, lines 12-16.

4. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as anticipated by Nelson (3,566,219). Nelson discloses the claimed subject matter at Fig. 9 with first and

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second contact regions 38, first and second contacts 446, 47, substrate 16, 26, 16 an N substrate, the diffusion region of opposite conductivity in the P Substrate, and third contact, an inherent Schottky contact 46, since it is a metal contact touching the P region 34. Diffusion and variable resistance is at col. 2, lines 40-45 The depletion region is the pinch off region at col. 1, lines 20-45. There is no bias disclosed at Fig. 9 so that a lack of bias is contemplated such as when the device is not in use. In claim 4, the substrate 26 has the insulator 19, where 16 is silicon so it is a silicon on insulator substrate since 16 is part of the substrate.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by Gray (6087193). or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gray (6087193) in view of Hayama (5260595). Gray discloses the claimed subject matter at Figs. 26 with first and second contact regions 140, and 110/120, substrate the P substrate, the diffusion region in the EPI layer, third contact 150. The Schottky diode or barrier is 57. The depletion region and change in resistance is disclosed at col. 8. Diffusion is disclosed in general at col. 8, lines 50-62, or col. 10, lines 1-15, as a method for forming all the disclosed devices so that diffusion is contemplated for the regions at Fig. 26 to form a diffusion resistor. The device of Fig. 26 is expected to have the same manner of operation as that of Fig. 24, which is a variable resistor, since the depletion region

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changes and changes the resistance of the device, as noted at col. 8. As an alternative, where the Gray Fig. 26 embodiment resistor is not a diffusion resistor, Hayama discloses diffusion resistors to minimize the effects of radiation noise at cols. 1-2 generated in the depletion region, so that it would have been obvious to employ a diffusion resistor where the depletion type resistors are disclosed in both references and diffusion is well known as one method of forming semiconductor type resistors. In claim 20, elements 380 or 390, which are the diffusion resistors of Gray are connected to inputs and outputs of driver circuit 360. Or vice versa, 360 is connected to the input and output of 380, 390. Before the batteries are turned on, or before the device is turned on, there is no bias voltage. Or, it would have been obvious, under the 103 alternative, not to turn the device batteries on in order to save power, or to sell the device without power, such as is generally done with resistors or transistors, to save money and power.

7. Claims 3 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gray (6087193) (with Hayama above as necessary) or Nelson (3,566,219), in view of Bhatia et al. (4426655). Gray discloses the claimed invention as noted above except the tungsten metal and p-type substrate. Bhatia discloses at top of col. 3 using many metals including tungsten as useful for forming Schottky diodes as having the correct barrier so that it would have been obvious to employ that metal where Gray discloses metal contacts in general. Bhatia at Fig. 1 and Gray at Fig. 25 each discloses p-type substrates for forming variable resistors so that it would have been obvious to employ the known type of substrate in a semiconductor device where there are limited types, n,

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p or insulating, etc. Similar remarks apply to Nelson where there is an insulating layer 19 and another substrate 16 so that stacking different types of substrates where one is a p would have been obvious, since P type silicon is disclosed as well as N, and those are the only two types known. In claim 5, the contacts are n+ in Gray. In claim 6 the metal is seen as hatched metal, or as the alternative, see the remarks with respect to Bhatia. Or as to Nelson claim 5, the n+ regions are as depicted as N+ in Figs. 9-10; while for claim 6, metal is at col. 1, lines 51-60 into the three contact windows noted above.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gray (6087193) (with Hayama above as necessary), or Nelson (3,566,219), or Dorda et al. (4,219,829), in view of Kluth (6521515). The claimed invention is disclosed as noted except the salicided regions. Kluth at col. 1, lines 30-50 discloses such regions for forming contacts for the purpose of defining the contact regions with a low resistivity so that the method and product thereby would have been obvious. There is a desire for low resistivity because the drain 120 with emitter 110 includes metal and semi-metal, which includes salicides, for the contact, col. 9, lines 10-20, and one possibility mentioned is a superconductor, which suggests low conductivity.

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9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gray (6087193) (with Hayama above as necessary), or Dorda et al. (4,219,829), in view of Racanelli et al. (5,532,175). The claimed invention is disclosed as noted except the silicon on insulator substrate. Racanelli at col. 1, lines 5-20 discloses a host of advantages for such sol technology such as increased speed and density and reduced process steps for forming such devices so that such as substrate would have been obvious.

10. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gray (6087193) (with Hayama above as necessary), Nelson (3,566,219), or Dorda et al. (4,219,829), in view of Yu (2004/0075146). The claimed invention is disclosed as noted except the doping levels. Yu discloses at par. 37 that typical doping levels for contacts labeled N+, and N regions are in the claimed range in order to render the contact regions and resistive regions correctly conductive such that such levels would have been obvious where Gray, Nelson, and Dorda employ the similarly labeled N and N+ regions obvious to one of skill in the art as higher and lower concentrations as noted. For claim 8, "about 1E15" is met by 1E16 or rendered obvious thereover since a lower concentration obviously renders a higher resistance, where P levels are disclosed by Yu in the claimed range and N indicates or suggests a lower doping level than N+.

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11. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dorda et al. in view of Gerlach (3320550). The claimed invention is disclosed as noted except the use in a frequency driver circuit to match to a transmission line. Gerlach discloses using a negative resistance element, such as the Dorda device, to drive frequencies in an oscillator circuit, which would have been obvious since Dorda also discloses at col. 1 and Fig. 4 that negative resistance devices can be used in an oscillator circuit, which is a frequency driver, as interpreted here, so that it would have been obvious to match same since Gerlach discloses at col. 1, lines 48-60 matching to transmission lines to increase power, is well known with such negative resistance devices. Also at col. 7, lines 25-50, feedback is disclosed with different frequencies, while matching to a waveguide or transmission line is disclosed at col. 8, lines 1-17, by the tunnel diodes, which are suggested by the Dorda et al. at col. 1, lines 15-40, also disclosing tunnel diodes as negative resistance devices, so that same would have been obvious where both disclose negative resistance devices.


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12. Applicant's arguments filed 8/12/2005 have been fully considered but they are not persuasive, or moot. Applicant argues that the device at Fig. 26 requires a bias voltage. However, before the device is turned on, there is no bias voltage, meeting the claim. This is like applicant's claim. How can the resistor be in a circuit without having a bias applied to all the contacts ? There is no way this can happen. There will be a voltage at all three terminals of the Fig. 26 device, like that of applicant, if it is in a circuit. Or before the voltage is hooked up to the device, it meets the claim. Applicant next argues that because the device is not in external contact with any component it is not a resistor. This is not correct, a resistor need not be in a circuit. One can purchase such items without power hooked up to same.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl D. Easthom whose telephone number is (571) 272-1989. The examiner can normally be reached on M-Th, 5:30AM-4:00PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Karl D Easthom
Primary Examiner
Art Unit 2832

KDE